

C L A I M S

1. An apparatus for performing a semiconductor process on a target substrate, comprising:

5 a process container configured to accommodate the target substrate;

a gas supply system configured to supply a process gas into the process container;

10 a worktable disposed in the process container, the worktable having an upper surface on which the target substrate is placed, and a lower surface which is exposed inside the process container; and

a lifting mechanism configured to assist transfer of the target substrate with respect to the upper surface of the worktable,

15 wherein the lifting mechanism comprises

a lifter pin configured to support the target substrate,

a driving unit configured to move the lifter pin up and down, and

20 a guide hole configured to guide the lifter pin being moved up and down, the guide hole comprising a main hole portion which extends from the upper surface to the lower surface through the worktable, and an extended hole portion which extends into an extension sleeve which projects downward from the lower surface
25 of the worktable to correspond to the main hole portion.

2. The apparatus according to claim 1, wherein a length of the extended hole portion of the guide hole is larger than a half length of the main hole portion of the guide hole.

5 3. The apparatus according to claim 1, wherein an upper end of an auxiliary pipe is attached to the lower surface of the worktable, and the auxiliary pipe as a whole forms the extension sleeve, such that the extended hole portion is formed in the auxiliary pipe.

10 4. The apparatus according to claim 1, wherein an auxiliary pipe is inserted into a through hole which vertically extends through the worktable, and a portion of the auxiliary pipe, which projects downward from the lower surface of the worktable, forms the extension
15 sleeve, such that the main hole portion and the extended hole portion are formed in the auxiliary pipe.

 5. The apparatus according to claim 4, further comprising a flange formed at an upper end portion of the auxiliary pipe to engage with the worktable, and a
20 fixing member configured to abut against the lower surface of the worktable to engage with an outer surface of the auxiliary pipe, wherein the auxiliary pipe is fixed to the worktable by cooperation of the flange and the fixing member.

25 6. The apparatus according to claim 1, wherein
the driving unit moves the lifter pin up and down between first and second states, and the lifter pin

protrudes above the upper surface of the worktable in order to assist transfer of the target substrate in the first state, and retracts below the upper surface of the worktable in order to perform the semiconductor process in the second state, and

in the second state, a lower contact point at which the lifter pin comes in contact with an inner surface of the guide hole is positioned above a lower end portion of the extension sleeve.

7. The apparatus according to claim 6, wherein the lifter pin has an upper shaft portion and a lower shaft portion having a diameter smaller than that of the upper shaft portion, and a lower end portion of the upper shaft portion forms the lower contact point.

8. The apparatus according to claim 1, wherein the lower shaft portion has a tapered shape which gradually decreases a diameter thereof downward.

9. The apparatus according to claim 1, wherein an inner surface of the extended hole portion of the guide hole gradually increases a diameter thereof downward.

10. The apparatus according to claim 1, wherein the driving unit moves the lifter pin up and down between first and second states, and the lifter pin protrudes above the upper surface of the worktable in order to assist transfer of the target substrate in the first state, and retracts below the upper surface of the worktable in order to perform the semiconductor

process in the second state, and

an annular recess is formed in an outer surface of the lifter pin, and positioned above a lower end portion of the extension sleeve in the second state of the lifter pin.

11. The apparatus according to claim 1, wherein the driving unit moves the lifter pin up and down between first and second states, and the lifter pin protrudes above the upper surface of the worktable in order to assist transfer of the target substrate in the first state, and retracts below the upper surface of the worktable in order to perform the semiconductor process in the second state, and

a longitudinal groove portion is formed in an outer surface of the lifter pin, and positioned above a lower end portion of the extension sleeve in the second state of the lifter pin.

12. The apparatus according to claim 4, wherein a longitudinal groove portion is formed in an inner surface of the auxiliary pipe.

13. The apparatus according to claim 1, wherein a lower end portion of the lifter pin abuts against a driving surface of the driving unit so as to be separable therefrom.

14. The apparatus according to claim 1, further comprising a column supporting the worktable, wherein the worktable is supported by the process container via

the column.

15. The apparatus according to claim 14, wherein
the process container comprises an exhaust space which
is formed below the lower surface of the worktable so
5 as to have a planar contour smaller than the worktable
and surround the column, and an exhaust system
configured to exhaust the process container is
connected to the exhaust space.